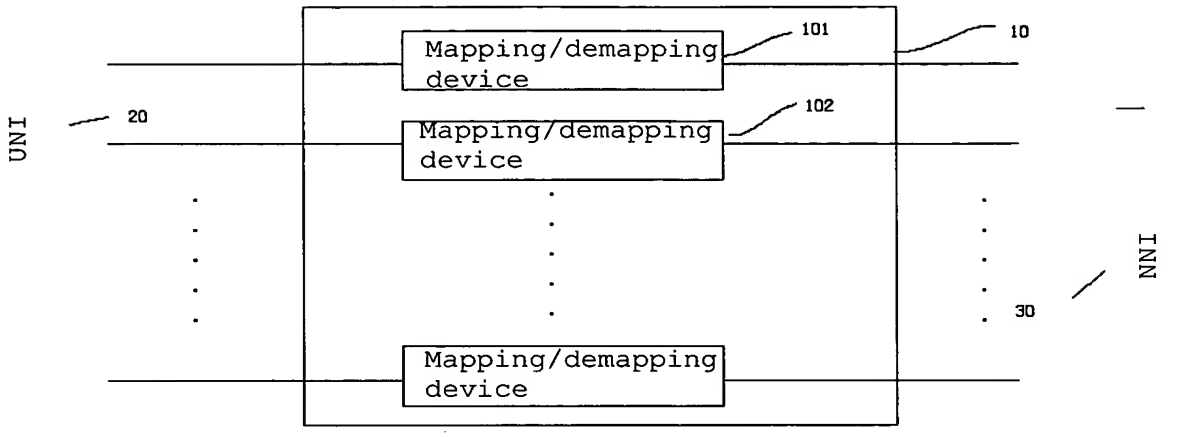

Fig. 1 (PRIOR ART)

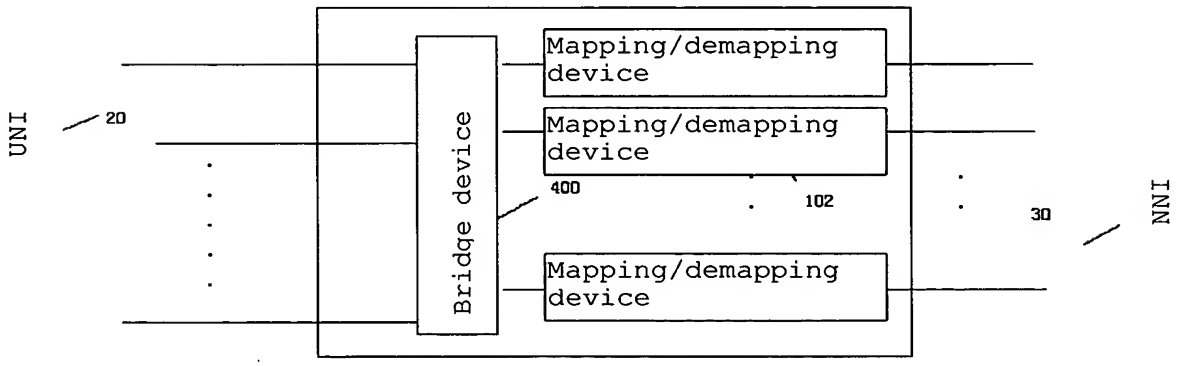

Fig. 2A (PRIOR ART)

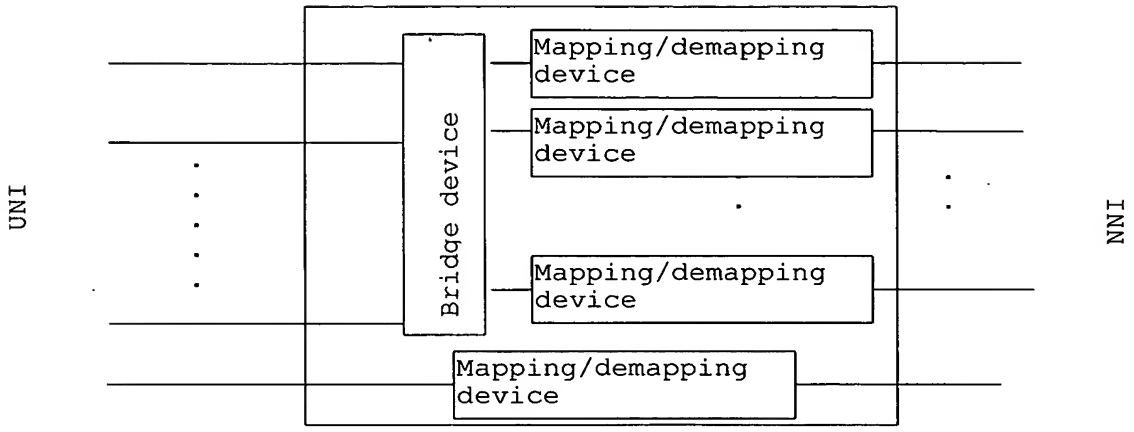

Fig. 2B (PRIOR ART)

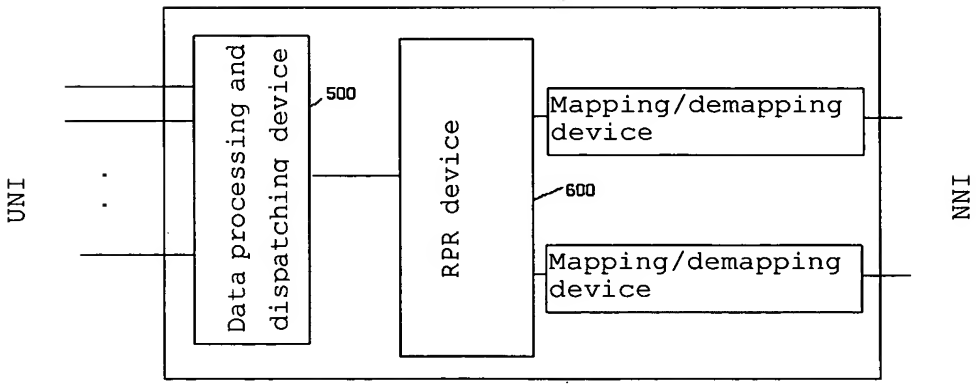

Fig. 3 (PRIOR ART)

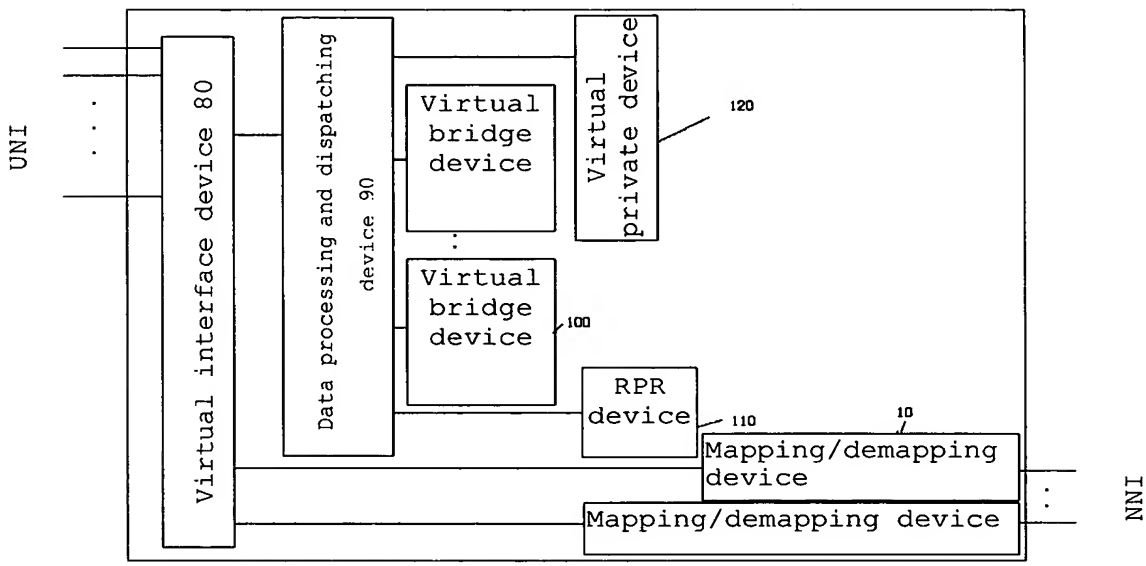
UNI
Virtual interface device 80
Data processing and dispatching device 90
Virtual bridge device
Virtual bridge device
100
Virtual private device
120
RPR device
110
10
Mapping/demapping device
Mapping/demapping device
NNI

Fig. 4A

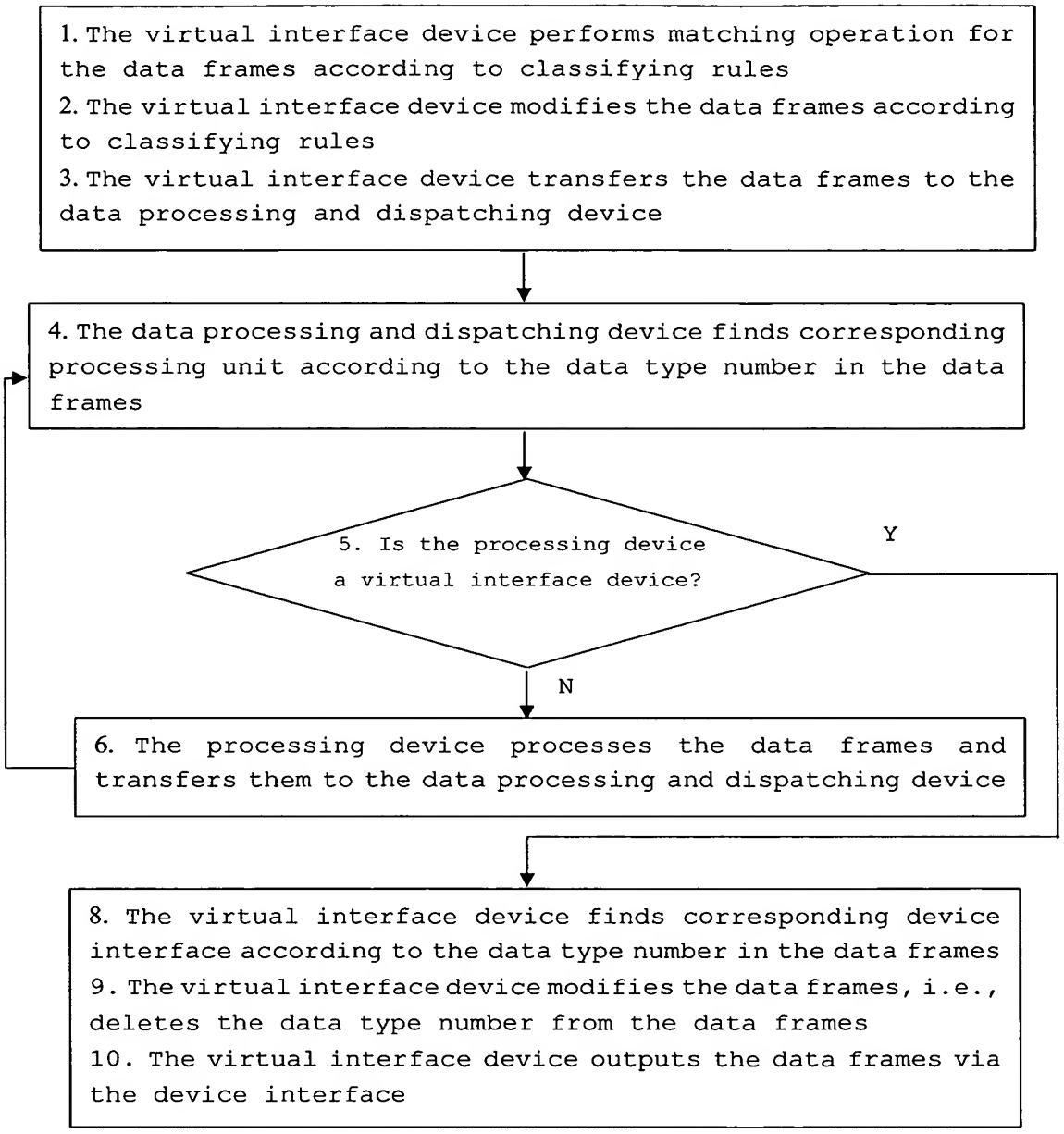
1. The virtual interface device performs matching operation for the data frames according to classifying rules
2. The virtual interface device modifies the data frames according to classifying rules
3. The virtual interface device transfers the data frames to the data processing and dispatching device
4. The data processing and dispatching device finds corresponding processing unit according to the data type number in the data frames
5. Is the processing device a virtual interface device?
Y
N
6. The processing device processes the data frames and transfers them to the data processing and dispatching device
8. The virtual interface device finds corresponding device interface according to the data type number in the data frames
9. The virtual interface device modifies the data frames, i.e., deletes the data type number from the data frames
10. The virtual interface device outputs the data frames via the device interface

Fig. 4B

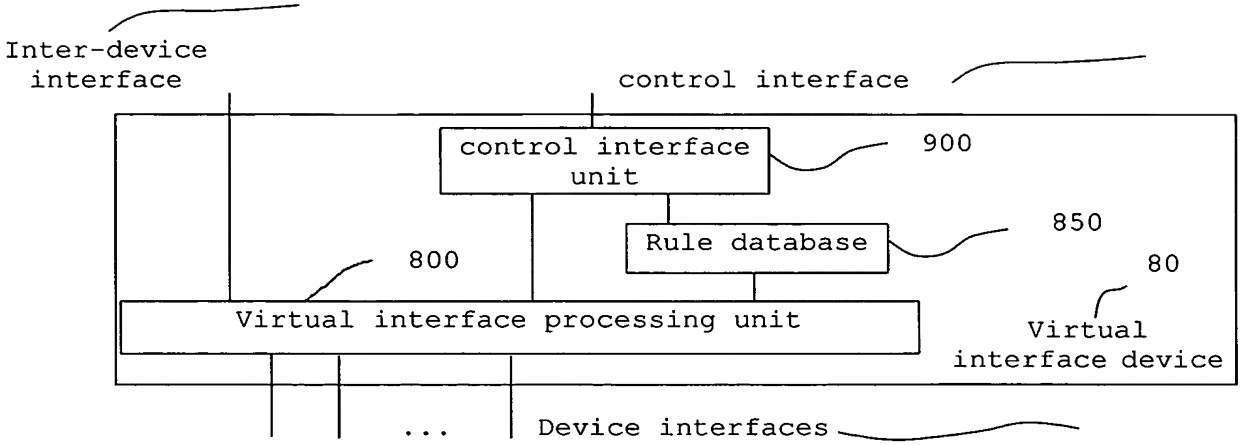
Inter-device interface
control interface
control interface unit
900
Rule database
850
800
80
Virtual interface processing unit
Virtual interface device
...
Device interfaces

Fig. 4C

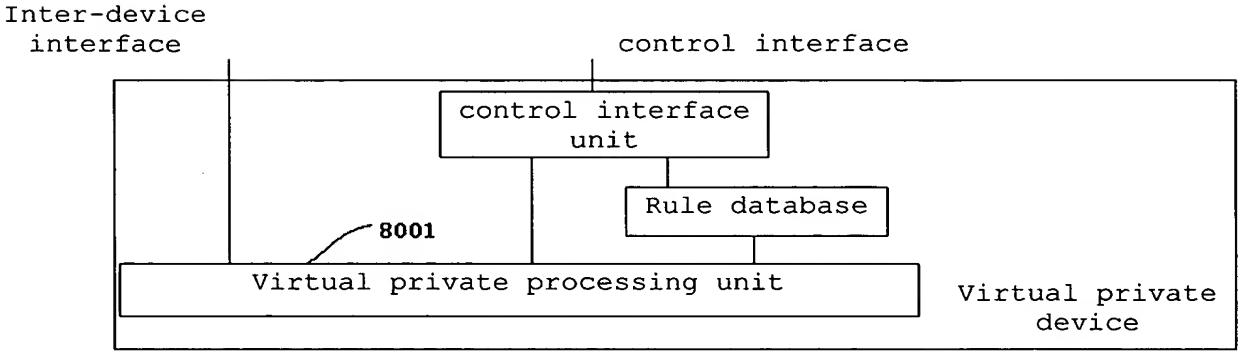
Inter-device interface
control interface
control interface unit
Rule database
8001
Virtual private processing unit
Virtual private device

Fig. 5A

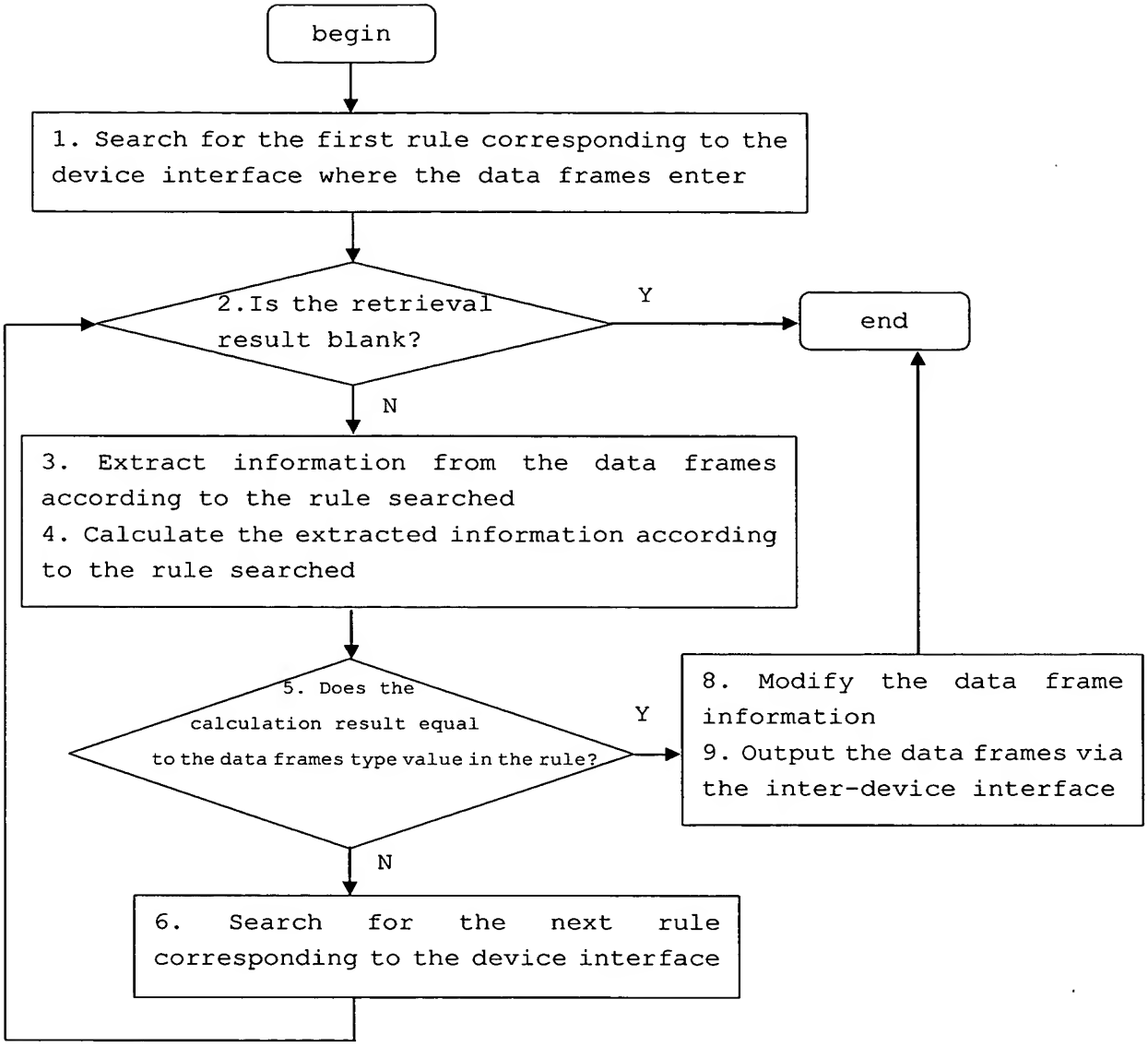
begin
1. Search for the first rule corresponding to the device interface where the data frames enter
2.Is the retrieval result blank?
Y
end
N
3. Extract information from the data frames according to the rule searched
4. Calculate the extracted information according to the rule searched
5. Does the calculation result equal to the data frames type value in the rule?
Y
8. Modify the data frame information
9. Output the data frames via the inter-device interface
N
6. Search for the next rule corresponding to the device interface

Fig. 4D

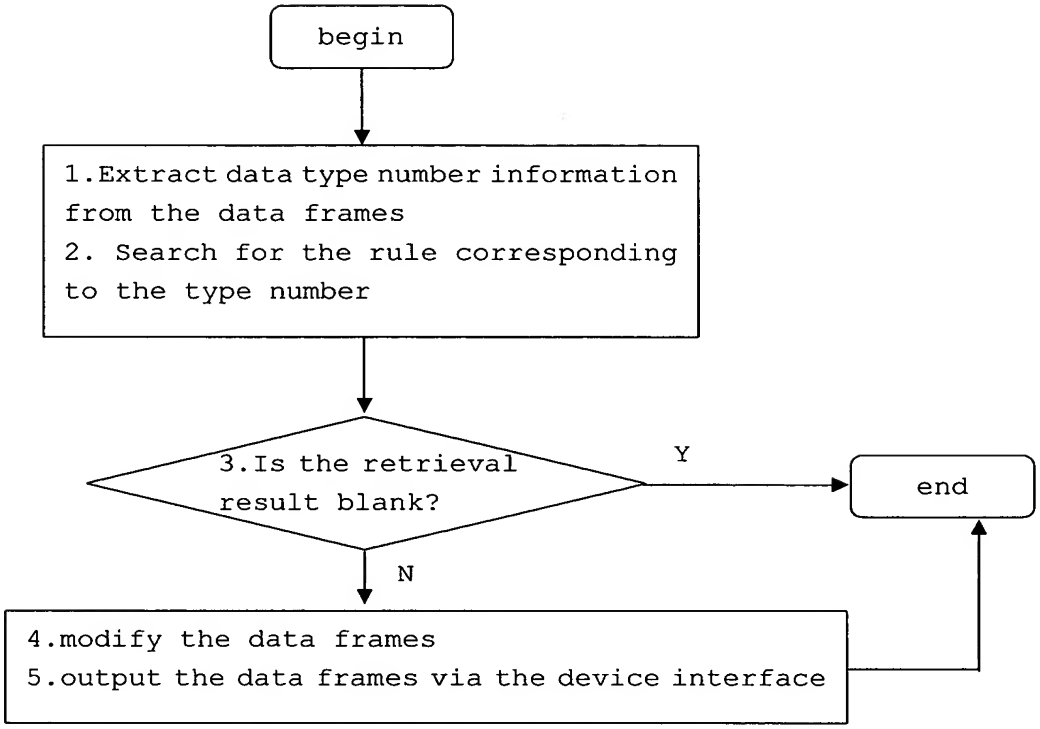
begin
1.Extract data type number information from the data frames
2. Search for the rule corresponding to the type number
3.Is the retrieval result blank?
Y
end
N
4.modify the data frames
5.output the data frames via the device interface

Fig. 4E

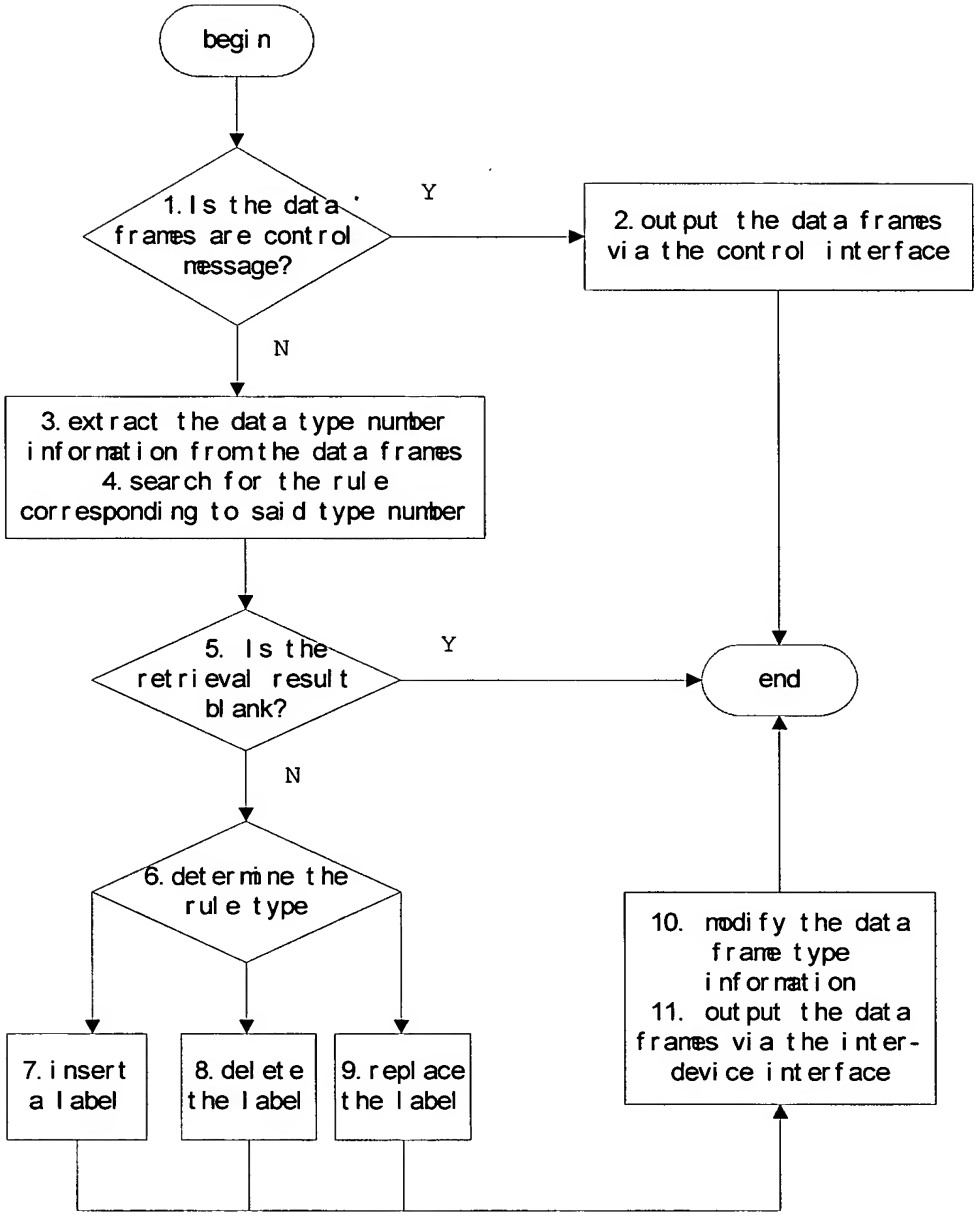
begin
1. Is the data frames are control message?
Y
2. output the data frames via the control interface
N
3. extract the data type number information from the data frames
4. search for the rule corresponding to said type number
5. Is the retrieval result blank?
Y
end
N
6. determine the rule type
7. insert a label
8. delete the label
9. replace the label
10. modify the data frame type information
11. output the data frames via the inter-device interface

Fig. 5B

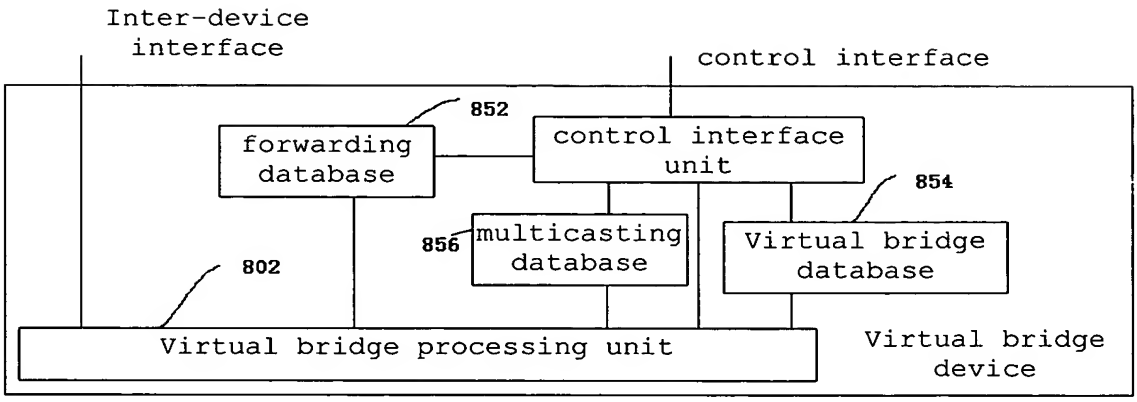
Inter-device interface
control interface
852
forwarding database
control interface unit
854
856
multicasting database
Virtual bridge database
802
Virtual bridge processing unit
Virtual bridge device

Fig. 6A

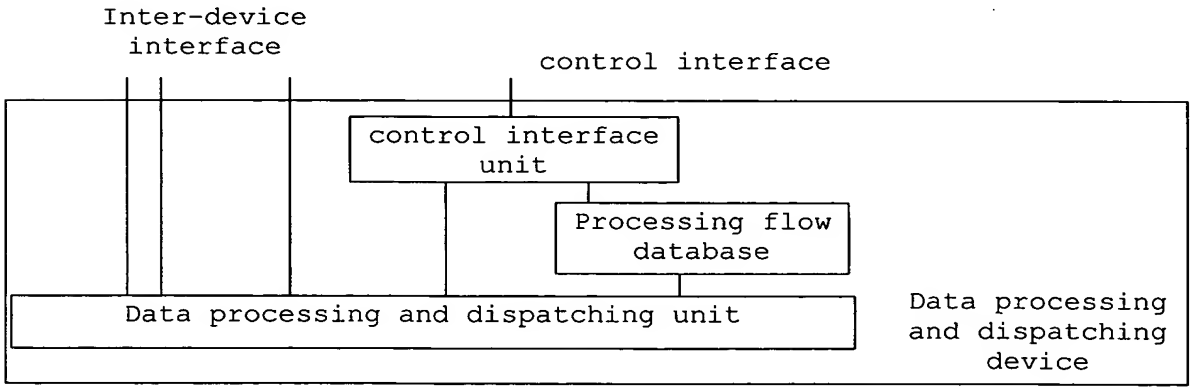
Inter-device interface
control interface
control interface unit
Processing flow database
Data processing and dispatching unit
Data processing and dispatching device

Fig. 7A

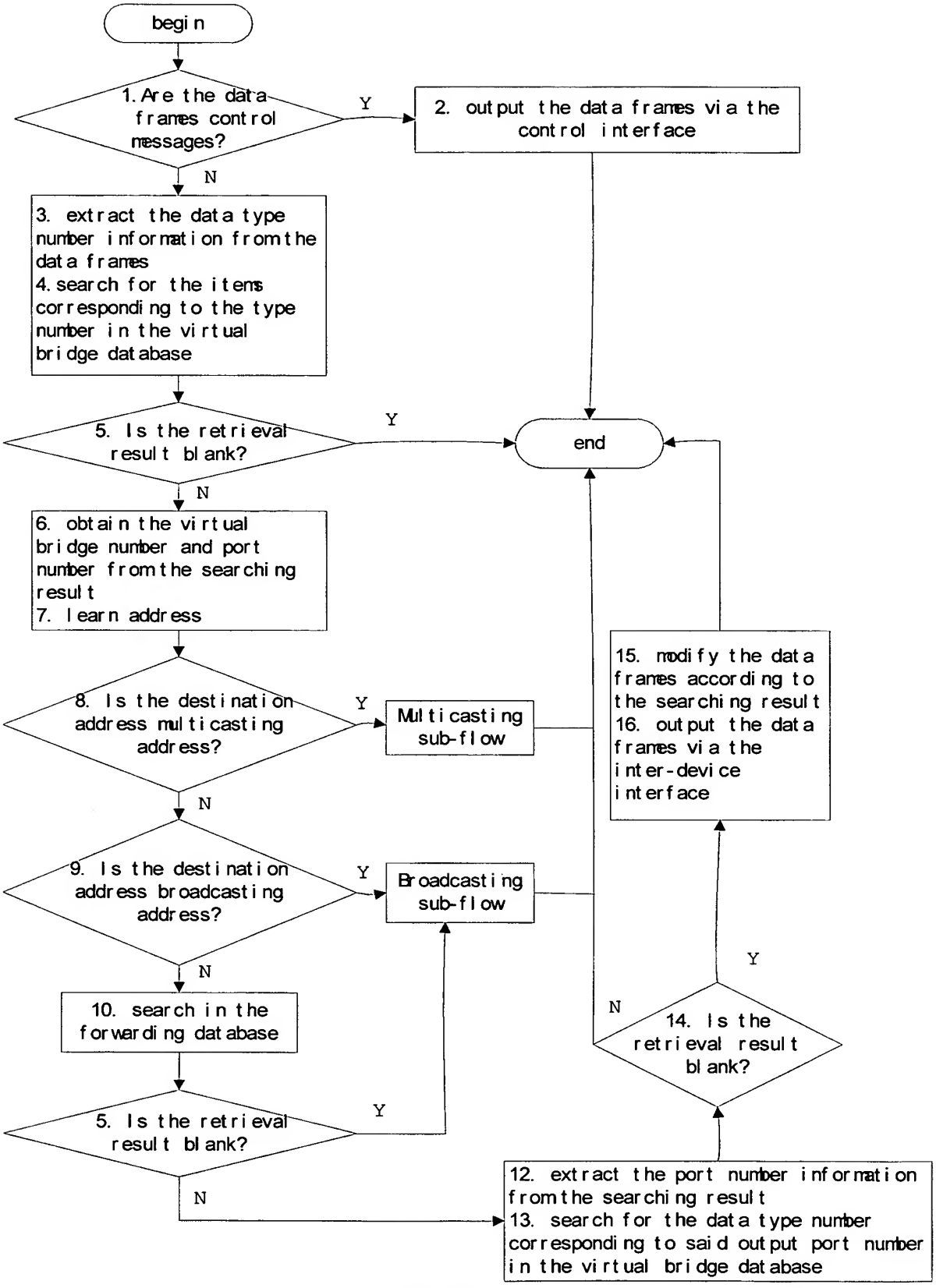
begin
1. Are the data frames control messages?
Y
2. output the data frames via the control interface
N
3. extract the data type number information from the data frames
4. search for the items corresponding to the type number in the virtual bridge database
5. Is the retrieval result blank?
Y
end
N
6. obtain the virtual bridge number and port number from the searching result
7. learn address
8. Is the destination address multicasting address?
Y
Multicasting sub-flow
N
9. Is the destination address broadcasting address?
Y
Broadcasting sub-flow
N
10. search in the forwarding database
5. Is the retrieval result blank?
Y
N
15. modify the data frames according to the searching result
16. output the data frames via the inter-device interface
Y
N
14. Is the retrieval result blank?
12. extract the port number information from the searching result
13. search for the data type number corresponding to said output port number in the virtual bridge database

Fig. 6B

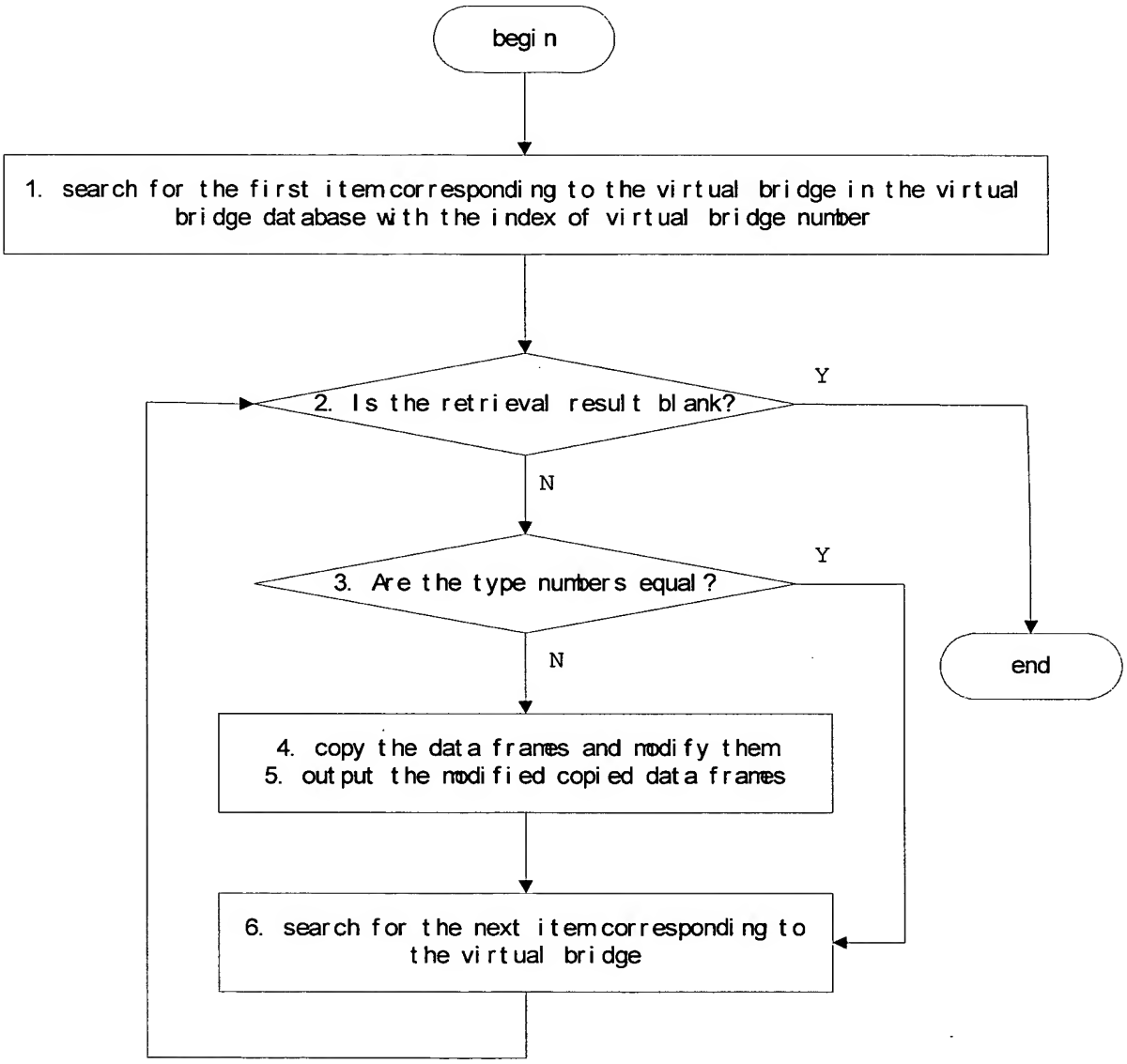
begin
1. search for the first item corresponding to the virtual bridge in the virtual bridge database with the index of virtual bridge number
2. Is the retrieval result blank?
Y
N
3. Are the type numbers equal?
Y
N
end
4. copy the data frames and modify them
5. output the modified copied data frames
6. search for the next item corresponding to the virtual bridge

Fig. 6C

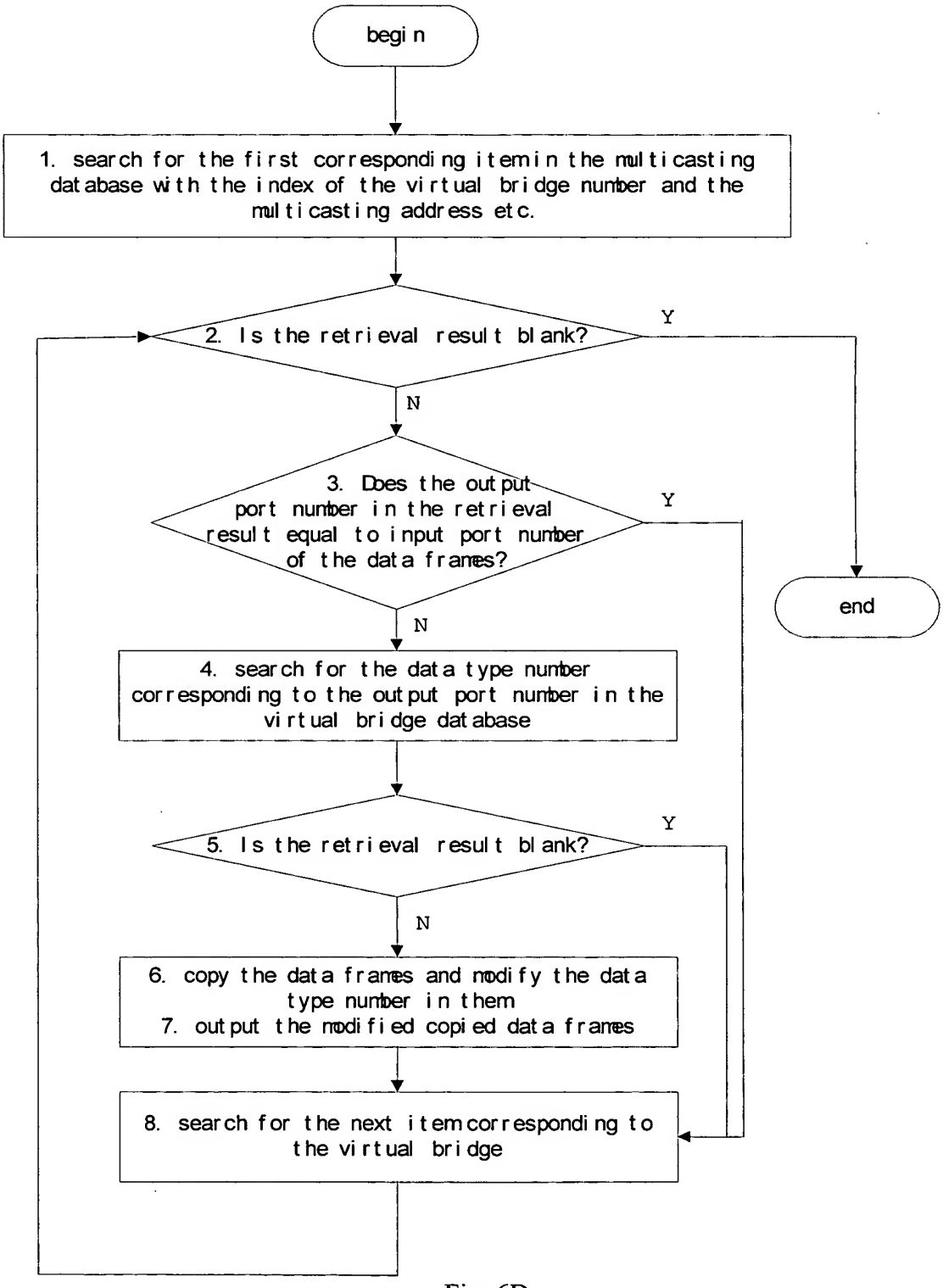
begin
1. search for the first corresponding item in the multicasting database with the index of the virtual bridge number and the multicasting address etc.
2. Is the retrieval result blank?
Y
N
3. Does the output port number in the retrieval result equal to input port number of the data frames?
Y
N
end
4. search for the data type number corresponding to the output port number in the virtual bridge database
5. Is the retrieval result blank?
Y
N
6. copy the data frames and modify the data type number in them
7. output the modified copied data frames
8. search for the next item corresponding to the virtual bridge

Fig. 6D

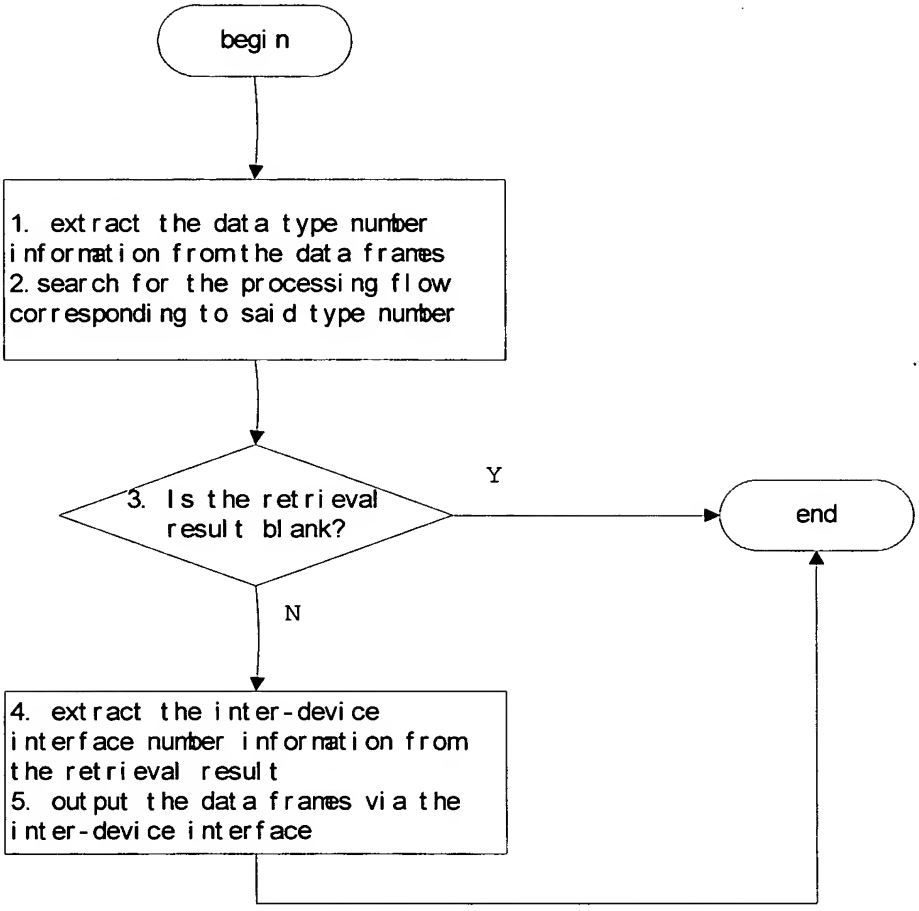
begin
1. extract the data type number information from the data frames
2. search for the processing flow corresponding to said type number
3. Is the retrieval result blank?
Y
end
N
4. extract the inter-device interface number information from the retrieval result
5. output the data frames via the inter-device interface

Fig. 7B